

International Journal of **ELECTRONICS**

Theoretical and Experimental

Editor: P. A. LINDSAY, D.Sc.(Eng.), Ph.D., D.I.C., C.Eng., F.I.E.E., F.Inst.P.

Consultant Editor: PROFESSOR SIR NEVILL MOTT, M.A., D.Sc., F.Inst.P., F.R.S.

Editorial Board

France - - - -	Professor P. AIGRAIN
U.K. - - - -	Dr. J. E. ALLEN
U.K. - - - -	Professor A. H. W. BECK
U.S.A. - - - -	Professor M. CHODOROW
U.K. - - - -	Professor K. G. EMELEUS
Switzerland - -	Professor G. EPPRECHT
France - - - -	Dr. M. GOLDMAN
The Netherlands -	Professor Dr. H. GROENDIJK
West Germany -	Professor Dr. rer. nat. W. HARTH
West Germany -	Professor Dr. H. L. HARTNAGEL
U.K. - - - -	Professor C. A. HOGARTH
U.S.A. - - - -	Dr. H. KOGELNIK
U.S.A. - - - -	Dr. J. M. LAFFERTY
U.K. - - - -	T. P. McLEAN
U.K. - - - -	C. A. MAY
U.S.A. - - - -	Professor R. D. MIDDLEBROOK
U.K. - - - -	D. H. ROBERTS
U.S.A. - - - -	Professor L. D. SMULLIN
U.K. - - - -	Dr. D. T. SWIFT-HOOK
U.K. - - - -	P. E. TRIER
Japan - - - -	Dr. M. UENOHARA
Sweden - - - -	Professor P. WEISSGLAS
U.S.A. - - - -	Professor J. R. WHINNERY

Volume LI

July 1981 to December 1981



Published by

TAYLOR & FRANCIS LTD, 4 John Street, London WC1N 2ET

Subscription Information

U.S.A. Canada and Mexico (air freight): annual subscription (payable in advance), \$340.00; per part \$32.00 (surface post paid). Air freighted to the USA and mailed from Jamaica, New York, by Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003. Second class postage paid at Jamaica, New York. US subscribers should send order and cheque (in favour of Taylor & Francis Ltd) to Account 04 810 879 Bankers Trust Company, P.O. Box 9137, Church Street Station, New York, N.Y. 10049.

Japan (accelerated surface post): apply to exclusive agents, Kinokuniya Company Ltd, Odakyu West-Shinjuku Building, 47 1 Hatsudai 1-chome, Shibuya-ku, Tokyo 151, Telex 2322535.

FR Germany (surface post): annual subscription (payable in advance), DM 519.00; per part DM 49.00. Subscribers in FR Germany should send order and cheque (in favour of Taylor & Francis Ltd) to Account No. 073/6686, Deutsche Bank AG, BLZ 500 700 10, Postfach 2623, Rossmarkt 18, 6000 Frankfurt/Main 1.

U.K. and the rest of the world (surface post; accelerated surface post to Australasia; air freight to India): annual subscription (payable in advance), £118.00; per part £12.00 (surface post paid).

Published monthly by Taylor and Francis Ltd, 4 John Street, London WC1N 2ET, UK. Telex 858540.

Printed by Taylor & Francis (Printers) Ltd, Rankine Road, Basingstoke, Hampshire RG24 0PR, UK.

© 1981 Taylor & Francis Ltd. ISSN 0020 7217.

CONTENTS OF VOL. LI (Nos. 1-6)

NUMBER 1—JULY

A method of improving transient characteristics of functions with monotonic magnitudes. D. M. RABRENOVIĆ and Ž. J. ALEKSIĆ.....	1
Predistortion design of active filters to compensate for finite gain-bandwidth. A. M. DAVIS.....	15
Stepped wave current source inverter. G. N. REVANKAR, A. BASHIR and S. S. HAVNUR.....	31
Digitally controlled multiple-pulse-width-modulated AC chopper for power control. S. A. K. BHAT.....	45
Synthesis of a concave monotonically increasing function using the diode-equation model. M. T. ABUELMA'ATTI.....	57
A simple non-linear D/A converter. H. S. SHIVARAM and A. P. SHIVAPRASAD.....	63
Variational principles for Maxwell's equations II. N. ANDERSON and A. M. ARTHURS.....	71
A Petri net approach to the evaluation of the complexity of a program. G. S. HURA, H. SINGH and N. K. NANDA.....	79
Photoconduction in GaSe thin films. M. K. ANIS, M. Y. ZAHEER and F. M. NAZAR.....	87
Books received.....	91

NUMBER 2—AUGUST

Invited paper. The interaction of mode-locked laser pulses with intrinsic silicon. M. S. DEMOKAN.....	93
Some simplifications of boolean expressions using their topological and statistical properties. L. GÓMEZ, R. GÓMEZ and B. GARCIA.....	145
Phase-compensated voltage-controlled voltage source networks. G. WILSON.....	157
High-field conduction mechanism changes in anodic WO ₃ and Ta ₂ O ₅ films. F. M. NAZAR and M. T. ATIQ.....	165
Switched-capacitor implementation of analogue sampled-data recursive filters. J. J. MULARKA.....	173
Impedance of Zener diodes at low frequencies. B. W. RICKETTS.....	181

Research notes

Modulation of the plasma emerging from a duoplasmatron. A. M. A. NOSSAIR and K. PHILLIPS	185
Memory switching in cadmium-zinc-phosphate glasses. M. A. GHOURI and C. A. HOGARTH	193
Erratum	199

NUMBER 3—SEPTEMBER

Band gap variation with composition in cadmium phosphate glasses. M. A. GHOURI, W. H. BOKHARI and F. M. NAZAR	201
UV photoconduction in α -Al ₂ O ₃ single crystals. F. M. NAZAR and S. A. SIDDIQI	205
Conductivity and Hall mobility in GaSe single crystals. M. K. ANIS and F. M. NAZAR	211
Analysis of photovoltaic systems including a battery storage. G. DE MEY, H. SIMOENS and A. DE VOS	215
Experimental behaviour and two-dimensional simulations of MOS transistors in weak inversion region. F. RUNOVIC, T. ARNBORG and K. BJÖRKQVIST	221
A powerful concatenated matrix code using cyclic product and matrix codes. D. C. VOUKALIS	225
A solid-state tachometer for three-phase slip-ring induction motors. P. S. SRINIVASAN and C. VELAYUDHAN	231
Sign detection of negabinary numbers. B. CHANDRAMOULI and G. S. RATH	235
Economical synthesis of regular expressions for large-state sequential machines. B. THOMAS and P. C. CHANDRASEKHARAN	241
A non-linear analogue-to-digital converter for linearization of transducer input-output relationships. H. S. SHIVARAM and A. P. SHIVAPRASAD	247
A broadband magneto-electric transducer using a composite material. L. P. M. BRACKE and R. G. VAN VLIET	255
A stabilized X-band MIC Gunn oscillator using a dielectric resonator. D. SINGH, C. K. CHATTERJEE and E. B. RAO	263
Correspondence	
Note on normal cold cathode glow discharges. K. G. EMELEUS	269
Books received	273

NUMBER 4—OCTOBER

Editorial. V. L. GRANATSTEIN.....	275
Invited paper. Powerful millimetre-wave gyrotrons. A. V. GAPONOV, V. A. FLYAGIN, A. L. GOL'DENBERG, G. S. NUSINOVICH, SH. E. TSIMRING, V. G. USOV and S. N. VLASOV	277
Invited paper. A partly self-consistent theory of the gyrotron. P. CHARBIT, A. HERSCOVICI and G. MOURIER.....	303
Invited paper. Cyclotron maser instability as a resonant limit of space charge wave. Y. Y. LAU, M. J. BAIRD, L. R. BARNETT, K. R. CHU and V. L. GRANATSTEIN.....	331
The kinetic theory of the electron cyclotron resonance maser with space charge effect taken into consideration. LIU SHENGGANG and YANG ZHONGHAI.....	341
Space charge effects on the equilibrium of guided electron flow with gyromotion. A. T. DROBOT and K. KIM.....	351
Linear gyrotron interaction with a beam of distributed pitch angle. C. J. EDGCOMBE	369
Invited paper. Self-consistent large-signal interaction in a TWT gyrotron. P. A. LINDSAY	379
Solitons and non-linear gyro-TWT theory. G. E. THOMAS	395
Improved computer modelling of magnetron injection guns for gyrotrons. M. CAPLAN and C. THORINGTON	415
Invited paper. Design considerations for a megawatt CW gyrotron. K. J. KIM, M. E. READ, J. M. BAIRD, K. R. CHU, A. DROBOT, J. L. VOMVORIDIS, A. GANGULY, D. DIALETIS and V. L. GRANATSTEIN	427
The design and testing of a new type of hollow beam gun for use in gyrotrons. J. E. ATKINSON and D. PERRING.....	447
Mode interaction in gyrotrons. G. S. NUSINOVICH	457
Use of weakly irregular waveguide theory to calculate eigenfrequencies, Q values, and RF field functions for gyrotron oscillators. A. W. FLIFLET and M. E. READ	475
Invited paper. The study of a TE ₀₂ mode gyromonotron operating at the second harmonic of the cyclotron frequency. GUO HE-ZONG, CHEN ZENG-GUI, ZHANG SHI-CHANG and WU DE-SHUN.....	485
Invited paper. Theory of a slow wave cyclotron amplifier. K. R. CHU, A. K. GANGULY, V. L. GRANATSTEIN, J. L. HIRSHFIELD, S. Y. PARK and J. M. BAIRD	493
Analysis of two-cavity gyrokylystron. A. K. GANGULY and K. R. CHU	503
Theory of gyrotron amplifier in a waveguide with inner dielectric material. HAN S. UHM, JOON Y. CHOE and SAEYOUNG AHN.....	521
Initial launching loss in gyrotron devices. C. J. EDGCOMBE	533
Relativistic gyrotrons and cyclotron autoresonance masers. V. L. BRATMAN, N. S. GINZBURG, G. S. NUSINOVICH, M. I. PETELIN and P. S. STRELKOV.....	541
Cyclotron emission from intense relativistic electron beams in uniform and rippled magnetic fields. R. E. SHEFER and G. BEKEFI	569

Small signal bandwidth characteristics of a travelling-wave gyrotron amplifier. A. J. SANGSTER	583
Numerical calculation of gyromonotron parameters using orbital theory. CHANG CHIN-LIN, TSAO HUANG-CHIANG and CHEN ZHIYI.....	595

NUMBER 5—NOVEMBER

Invited paper. Exoelectron emission from solids. A. J. B. ROBERTSON	607
A unified one-dimensional analysis of the gain mechanism in free electron lasers with helical or planar magnet arrays. P. J. FIELDING	621
The rapid development of space charge in a thermally produced plasma. N. ST. J. BRAITHWAITE and J. E. ALLEN	637
On the stability of an active gyrator operating at high frequencies. M. MIURA, Y. FUKUI and S. YONEDA.....	653
Wave propagation studies on MESFET electrodes. Y. A. REN and H. L. HARTNAGEL	663
Architecture of the fast Walsh-Hadamard and fast Fourier transforms with charge transfer devices. R. YARLAGADDA and J. E. HERSHEY	669
Experimental investigations on reactance-loaded waveguide arrays. S. N. SINHA and R. P. AGARWAL	683
Relative humidity measurement using a microcomputer. J. Y. F. CHEN and C. L. TEO	693
A fast procedure for finding prime implicants of a boolean function. S. C. GUPTA.....	701
A pipeline A/D converter suitable for high sampling rates. K. MUNIAPPAN	711
Books received	715

NUMBER 6—DECEMBER

The I - V characteristics for planar thermionic diodes with patchy cathodes. A. H. BECK and D.-A. WANG.....	717
Negative transient currents in amorphous semiconductors. V. I. ARKHIPOV, M. A. IOVU, M. S. IOVU, A. I. RUDENKO and S. D. SHUTOV.....	735
Photoconduction in GaSe single crystal. F. M. NAZAR, M. K. ANIS and N. MALIK.....	743
A new universal logic gate (ULG3) based on the Reed-Muller canonic expansion. X. WU and S. L. HURST.....	747

A thyristor reactive power compensator for fast-varying industrial loads. S. R. DORADLA and B. K. PATEL	763
The conduction band structure of $\text{Ga}_{1-x}\text{Al}_x\text{As}$ alloys from Hall mobility measurements at high pressures. A. K. SAXENA	779
Electrical ionization and breakdown of mono- and cyclo- olefin vapours. A. E. D. HEYLEN.....	793
Synthesis of non-monotonic single-valued function generators without using operational amplifiers. M. T. ABUELMA'ATTI	803
Some new digital control schemes for three-phase zero-voltage switching. S. A. K. BHAT	811
Complex permittivity of soil and water mixtures at 9 GHz. A. KUMAR	819
A class of multilevel error-correcting codes. V. C. DA ROCHA	825
Subject index	831
Author index.....	833

